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(81) Designated States (*unless otherwise indicated, for every kind of national protection available*): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ,

(54) Title: FILTERING OF ZERO UNIT

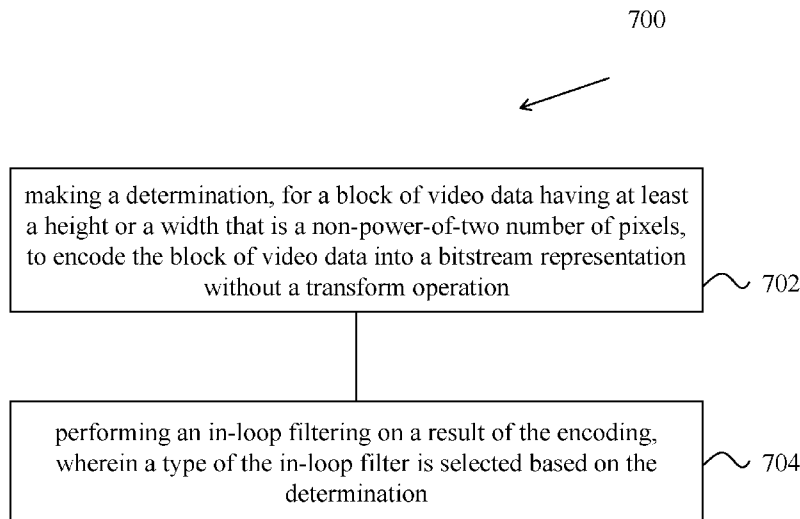


FIG. 7A

(57) Abstract: Devices, systems and methods for using zero-units in video and image coding are described. In a representative aspect, a method for video coding includes making a determination, for a block of video data having at least a height or a width that is a non-power-of-two number of pixels, to encode the block of video data into a bitstream representation without a transform operation and performing an in-loop filtering on a result of the encoding, wherein a type of the in-loop filter is selected based on the determination.



CA, CH, CL, CN, CO, CR, CU, CZ, DE, DJ, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, JO, JP, KE, KG, KH, KN, KP, KR, KW, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

- (84) Designated States** (*unless otherwise indicated, for every kind of regional protection available*): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

Published:

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- *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))*
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27 February 2020 (27.02.2020)

INTERNATIONAL SEARCH REPORT

International application No
PCT/IB2019/055553

A. CLASSIFICATION OF SUBJECT MATTER
 INV. H04N19/117 H04N19/127 H04N19/157 H04N19/167 H04N19/176
 H04N19/82
 ADD.
 According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED
 Minimum documentation searched (classification system followed by classification symbols)
 H04N

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
 EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	CA 3 019 490 A1 (SONY CORP [JP]) 16 November 2017 (2017-11-16) paragraphs [0067], [0087], [0818]	1-7,22, 23
A	WON K ET AL: "Transform skip based on minimum TU size", 14. JCT-VC MEETING; 25-7-2013 - 2-8-2013; VIENNA; (JOINT COLLABORATIVE TEAM ON VIDEO CODING OF ISO/IEC JTC1/SC29/WG11 AND ITU-T SG.16); URL: HTTP://WFTP3.ITU.INT/AV-ARCH/JCTVC-SITE/,, no. JCTVC-N0167, 19 July 2013 (2013-07-19) , XP030114644, abstract	1-7,22, 23

Further documents are listed in the continuation of Box C.

See patent family annex.

* Special categories of cited documents :

- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier application or patent but published on or after the international filing date
- "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed

- "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
- "&" document member of the same patent family

Date of the actual completion of the international search 23 October 2019	Date of mailing of the international search report 08/01/2020
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Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Authorized officer Lindgren, Johan
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INTERNATIONAL SEARCH REPORT

International application No
PCT/IB2019/055553

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	XIU X ET AL: "Rext HLS: on lossless coding", 17. JCT-VC MEETING; 27-3-2014 - 4-4-2014; VALENCIA; (JOINT COLLABORATIVE TEAM ON VIDEO CODING OF ISO/IEC JTC1/SC29/WG11 AND ITU-T SG.16); URL: HTTP://WFTP3.ITU.INT/AV-ARCH/JCTVC-SITE/,, no. JCTVC-Q0106, 17 March 2014 (2014-03-17), XP030116023, the whole document	1-7,22, 23
A	----- ROSEWARNE C ET AL: "CE1: Test 3 - Square transforms for Range Extensions", 103. MPEG MEETING; 21-1-2013 - 25-1-2013; GENEVA; (MOTION PICTURE EXPERT GROUP OR ISO/IEC JTC1/SC29/WG11),, no. m27482, 11 January 2013 (2013-01-11), XP030056052, the whole document -----	1-7,22, 23

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/IB2019/055553

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
CA 3019490	A1	16-11-2017	
		AU 2017261992 A1	22-11-2018
		CA 3019490 A1	16-11-2017
		CN 109076222 A	21-12-2018
		EP 3454559 A1	13-03-2019
		JP W02017195476 A1	22-03-2019
		KR 20190006953 A	21-01-2019
		US 2019104322 A1	04-04-2019
		WO 2017195476 A1	16-11-2017

INTERNATIONAL SEARCH REPORT

International application No.
PCT/IB2019/055553

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.

2. As all searchable claims could be searched without effort justifying an additional fees, this Authority did not invite payment of additional fees.

3. As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:

4. No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:
1-7, 22, 23

Remark on Protest

- The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
- The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-7, 22, 23

For a block having at least one side that is not a power of two (i.e. 2^N) long, determine to encode said block without transformation. Also, select a type of in-loop filter based on the determination not to apply transform coding.

2. claims: 8-16

In response to a block having at least one side that is not a power of two (i.e. 2^N) long, select and apply an adaptive loop filter, ALF. Further details on signalling implementations of the toggling on/off of ALF for sub-blocks of not 2^N blocks are claimed.

3. claims: 17-21

For any block (CU, PU, or TU), of any size, that is near a picture boundary, in-loop filtering is controlled (e.g., disabled). Further details pertaining to inferring signalling of such control information are claimed.
